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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,051	09/13/2003	Michael K. Gallagher	51473	6724
21874	7590	06/16/2006	EXAMINER	
EDWARDS & ANGELL, LLP			CHEN, KIN CHAN	
P.O. BOX 55874			ART UNIT	
BOSTON, MA 02205			PAPER NUMBER	

1765
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DATE MAILED: 06/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/661,051

Applicant(s)

GALLAGHER ET AL.

Examiner

Kin-Chan Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 and 19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 11, 2006 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Besling et al. (US 6,562,732; hereinafter "Besling") in view of Odian (p.18, "Principles of Polymerization", 1981, second edition) and Allen et al. (US 6,420,441; hereinafter "Allen").

In a method of manufacturing a device, Besling teaches that a sacrificial material layer may be disposed on a device substrate. An overlayer (e.g., porous dielectric) material may be disposed on the sacrificial material layer. The sacrificial material layer may be removed to form an air gap. The sacrificial material layer may comprise a polymer (abstract; col. 2, lines 34-44; Figures). Polymers typically may be linear, branched, or cross-linked polymers (p.18, "Principles of Polymerization", Odian). Besling teaches using a polymer as sacrificial material. Besling cites some examples, however, **Besling's disclosure is not limited to any type of polymer but teaches that the polymer is thermal degradable and is decomposed and removed at 400 °C. It is significant because the applicant's disclosure (page 20, last paragraph) also teaches using the same heating method and similar temperature range to remove the polymer (sacrificial material).** Hence, it would have been obvious to one with ordinary skill in the art to use any known thermal degradable polymer including instantly claimed cross-linked polymer in the process of Besling because it is one of the most popular polymers used in the industry and because it is taught by Odian.

***A reference is good not only for what it teaches but also for what one of ordinary skill might reasonably infer from the teachings. In re Opprecht 12 USPQ 2d 1235, 1236 (CAFC 1989); In re Bode USPQ 12; In re Lamberti 192 USPQ 278; In re Bozek 163 USPQ 545, 549 (CCPA 1969).***

Since the combined prior art of Besling and Odian teaches cross-linked polymers, it would have been obvious to one with ordinary skill in the art to use commercially available (well-known) cross-linker such as multi-ethylenically unsaturated monomer. Allen (col. 8, lines 25- 58) is only relied on to show some well-known cross-linkers. Hence, it would have been obvious to one with ordinary skill in the art to

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incorporate cross-linker of multi-ethylenically unsaturated monomer in the process of modified Besling and Odian because it is well-known cross-linker and because it is disclosed by Allen.

***The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, because it is a well-known (commercially available) feature, therefore, it is in the knowledge generally available to one of ordinary skill in the art.***

The limitations of claims 1, 4, 6, 10, 11, 12, 13, and 19 have been addressed above and rejected for the same reasons, supra.

As to claim 2, Besling teaches using a porous dielectric material as the overlay material, making an organic polysilica (organosilanes) material obvious because it is a well-known dielectric material in device fabrication.

As to claim 5, see col. 4, lines 4-5.

As to claim 8, see Figures.

As to claim 9, Besling teaches using polymer including UV photoresist material may be used as sacrificial material, making curing the sacrificial material composition for forming the sacrificial material obvious.

The above-cited claims differ from the prior art by specifying well-known features (such as cross-linked polymers in claims 3 and 7) to the art of device fabrication. It is the examiner's position that a person having ordinary skill in the art at the time of the claimed invention would have found it obvious to modify the prior art by adding any of same well-known features to same in order to fabricate an easily removable sacrificial material layer with a reasonable expectation of success. The

examiner takes official notice of facts that applicant did not traverse the aforementioned conventionality (e.g., well-known features, common knowledge, obviousness), which have been stated in the previous office action ( July 15, 2005).

4. Claims 1-13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Babich et al. (US 6,815,329; hereinafter "Babich") in view of Odian (p.18, "Principles of Polymerization", 1981, second edition) and Allen et al. (US 6,420,441; hereinafter "Allen").

In a method of manufacturing a device, Babich teaches that a sacrificial material layer may be disposed on a device substrate. An overlayer (e.g., porous dielectric) material may be disposed on the sacrificial material layer. The sacrificial material layer may be removed to form an air gap. The sacrificial material layer may comprise a polymer (col. 8 and 9; Figures). Polymers typically may be linear, branched, or cross-linked polymers (p.18, "Principles of Polymerization", Odian). Babich teaches using a polymer as sacrificial material. Babich cites some examples. **Babich's disclosure is not limited to any type of polymer but teaches that the polymer is thermal degradable and is decomposed and removed from 200 to 425°C. It is significant because the applicant's disclosure (page 20, last paragraph) also teaches using the same heating method and similar temperature range to remove the polymer (sacrificial material).** Hence, it would have been obvious to one with ordinary skill in the art to use any known thermal degradable polymer including instantly claimed cross-linked polymer in the process of Babich because it is one of the most

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popular polymers used in the industry and because it is taught by Odian. Since the combined prior art of Babich and Odian teaches cross-linked polymers, it would have been obvious to one with ordinary skill in the art to use commercially available (well-known) cross-linker such as multi-ethylenically unsaturated monomer. Allen (col. 8, lines 25- 58) is only relied on to show some well-known cross-linkers. Hence, it would have been obvious to one with ordinary skill in the art to incorporate cross-linker of multi-ethylenically unsaturated monomer in the process of modified Babich and Odian because it is well-known cross-linker and because it is disclosed by Allen.

***The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, because it is a well-known (commercially available) feature, therefore, it is in the knowledge generally available to one of ordinary skill in the art.***

The limitations of claims 1, 4, 6, 10, 11, 12, 13, and 19 have been addressed above and rejected for the same reasons, supra.

As to claim 2, Babich teaches using a porous dielectric material as the overlay material, making an organic polysilica (organosilanes) material obvious because it is a well-known dielectric material in device fabrication (col.9, lines 41-58).

As to claim 5, see col. 8, lines 64-66.

As to claim 8, see Figures.

The above-cited claims differ from the prior art by specifying well-known features (such as cross-linked polymers in claims 3 and 7; applying and curing a cross-linkable polymer in claim 9) to the art of device fabrication. It is the examiner's position that a person having ordinary skill in the art at the time of the claimed invention would

have found it obvious to modify the prior art by adding any of same well-known features to same in order to fabricate an easily removable sacrificial material layer with a reasonable expectation of success. The examiner takes official notice of facts that applicant did not traverse the aforementioned conventionality (e.g., well-known features, common knowledge, obviousness), which have been stated in the previous office action ( July 15, 2005).

### ***Response to Arguments***

5. Applicant's arguments filed March 3, 2006 (entered with RCE of May 11, 2006) have been fully considered but they are not persuasive. **Declaration under 37 CFR 1.132 filed on May 11, 2006** describes the definition and differences of linear and cross-linked polymer, which is notoriously well known in the art. As has been stated in the office action, Besling (or Babich) cited some polymers. Polymers typically may be linear, branched, or cross-linked polymers (p.18, "Principles of Polymerization", Odian). Besling (or Babich) teaches using a polymer as sacrificial material. Besling (or Babich) **disclosure is not limited to any type of polymer but teaches that the polymer is thermal degradable and is decomposed and removed from 200 to 425°C. It is significant because the applicant's disclosure (page 20, last paragraph) also teaches using the same heating method and similar temperature range to remove the polymer (sacrificial material).** Hence, it would have been obvious to one with ordinary skill in the art to use any known thermal degradable polymer including instantly claimed cross-linked polymer in the process of Besling (or Babich).



***However, reference's disclosure is not limited to the exemplified (materials) / process parameters (e.g., preferred pressure range or temperature range). See In re Fracalossi, 681 F.2d 792, 794 n.1, 215 USPQ 569, 570 n.1 (CCPA 1982).***

***A reference is good not only for what it teaches but also for what one of ordinary skill might reasonably infer from the teachings. In re Opprecht 12 USPQ 2d 1235, 1236 (CAFC 1989); In re Bode USPQ 12; In re Lamberti 192 USPQ 278; In re Bozek 163 USPQ 545, 549 (CCPA 1969).***

The broad interpretation of the patentee's limitation "polymer" is one which encompasses linear, branched, or cross-linked polymers. This is particularly true given that terms must be given their broadest reasonable interpretation consistent with, but not improperly limited. It would have been obvious to one with ordinary skill in the art that the disclosure of Besling (or Babich) is not limited to any type of polymer and **does not exclude cross-linked polymers.**

***Johnson Worldwide Assocs., Inc. v. Zebco Corp., 175 F.3d985, 989 (Fed.Cir. 1999).***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (571) 272-1461. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*June 12, 2006*

A handwritten signature in black ink, appearing to read 'K. C. Chen', with a long horizontal flourish extending to the right.

Kin-Chan Chen  
Primary Examiner  
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